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A new record of sea star genus *Pteraster* (Asteroidea: Velatida: Pterasteridae) from the East Sea, Korea

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An asteroid specimen was collected from Jumunjin, Gangwon-do in the East Sea, Korea at a depth of 50 m using fishing nets on 26 May 2013. It was identified as *Pteraster militaris* (O.F. Müller, 1776) belonging to the family Pterasteridae of the order Velatida based on morphological characteristics. This species is usually distributed in the cold boreal zone around northern Pacific and Atlantic, and is distinctly distinguished from *P. tesselatus* which was reported in Korean fauna: body form, length ratio of arm to disc and surface of dorsal membrane.

Keywords: East Sea, Korea, morphology, *Pteraster militaris*, sea star, taxonomy

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Introduction

Family Pterasteridae is almost exclusively from deep water and is of worldwide distribution (Clark and Downey, 1992), and is composed of eight genera: *Amembranaster* Golotsvan, 1998, *Benthaster* Sladen, 1882, *Calyptraster* Sladen, 1882, *Diplopteraster* Verrill, 1880, *Euretaster* Fisher, 1940, *Hymenaster* Thomson, 1873, *Hymenasterides* Fisher, 1911, and *Pteraster* Müller & Troschel, 1842 (Mah and Hansson, 2015). Species of this family usually have stout thick body, inflated dorsal surface, and supradorsal membrane forming a cover over dorsal surface. They have a hole in the middle of disc called osculum, which can be used to expel mucus for defending against predators, like many other members of the order Velatida (Mah, 2010). Genus *Pteraster* comprises 46 species of which *P. tesselatus* Ives, 1888 distributed Korea, Japan, and North Pacific Ocean have been reported in Korean fauna (Shin, 2010).

Materials and Methods

A sea star was collected at a depth of 50 m near waters of Jumunjin of Gangwon-do in the East Sea, Korea by fishing net and was preserved in 95% ethyl alcohol. This specimen was identified and described on the basis of morphological characteristics which were photographed using digital camera (D7000; Nikon, Tokyo, Japan) and stereo-microscope (Nikon SMZ1000). The specimen was deposited in the Marine Echinoderm Resource Bank of Korea (MERBK), Sahmyook University, Seoul, Korea. The identification of specimen was referred to Fisher (1911) and Clark and Downey (1992). This species was revealed as *Pteraster militaris* (O.F. Müller, 1776) which was found to be a newly reported species in Korean fauna, and the key of Korean *Pteraster* species was prepared in this study.

Systematic Accounts

Class Asteroidea de Blainville, 1830
Order Velatida Perrier, 1884
Family Pterasteridae Perrier, 1875
Genus *Pteraster* Müller and Troschel, 1842
Type species: *Pteraster militaris* (O.F. Müller, 1776)

Key to the Korean species of genus *Pteraster*

1. Body stellate form, R exceeding 2.0r ····· *P. militaris*
– Body more or less pentagonal form, R less than 2.0r ····· *P. tesselatus*

***Pteraster militaris* (O.F. Müller, 1776)**
주름입방불가사리 (신칭) (Fig. 1A-F)
Asterias militaris O.F. Müller, 1776: 234.
Asteriscus militaris Müller and Troschel, 1842: 44.
Pteraster aporus Ludwig, 1886: 293.

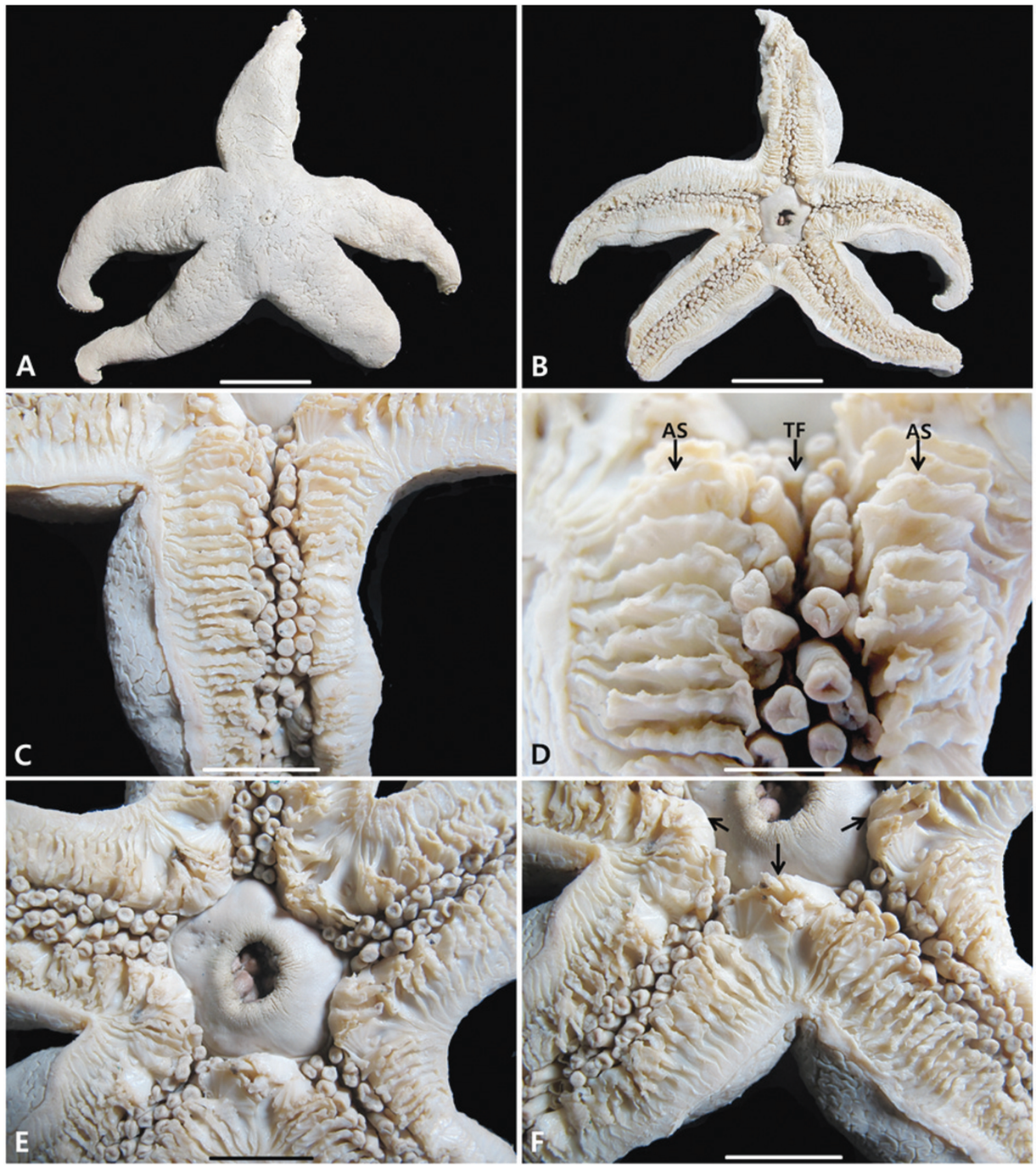

Fig. 1. *Pteraster militaris*. A, dorsal view; B, ventral view; C, ventral side of arm; D, webbed adambulacral spines (AS) and tube feet (TF); E, oral part; F, oral spines (arrows) and oral part. Scale bars: A, B = 5 cm; C, E, F = 3 cm; D = 1 cm.

Pteraster militaris Müller and Troschel, 1842: 128, pI. 6, figs la-b; Ludwig, 1900: 469; Clark, 1905: 2; 1908: 286; Fisher, 1911: 346, pI. 98, figs. 1, 2; Verrill, 1914: 272; Mortensen, 1927: 104, figs. 58, 60; D'yakonov, 1950: 68; Cherbonnier, 1969: 348; Clark and Downey, 1992: 331; Pawson *et al*., 2009: 1190; Mah and Hansson, 2015: 124147.

Material examined. One specimen, Jumunjin, 26 May 2013, at 50 m depth by fishing net, Lee, T. and D. Kim.

Description. Body stellate form, fleshy, smooth, soft and thick. Arms broad and tapered to tip. Supradorsal membrane thick, wrinkled, with calcareous deposits. Spiracles large, few. Paxillae short, low, thick, with three to five slender spines. Osculum small, surrounded by relatively few short blunt spines. Ambulacral groove fairly narrow. Adambulacral plates with five to nine spines, inner two spines short, others long, slender, blunt, regularly webbed. Web slightly thickened, undulating and continued outward as ridge on ventrolateral membrane. Oral plates moderate size, bearing five webbed oral spines, not webbed across interradius, sheathed in membrane, outermost spine small, others long, blunt, subequal, stout. Tube feet moderately robust, arranged in two rows.
Size. R = 14.5 cm, r = 6.1 cm, R/r = 2.4
Habitat. Rocky substrates.
Color. Color in life is light pink.
Distribution. Korea (East Sea), Japan, Russia, North Pacific Ocean, Arctic Ocean, Greenland, United Kingdom, Norway, Denmark, Sweden, Barents Sea, White Sea, North Atlantic Ocean, Gulf of Mexico.
Remarks. This species occurred in circumpolar region as an arctic-boreal species in North Pacific and North Atlantic (D'yakonov, 1950; Mah and Hansson, 2015). *Pteraster militaris* (O.F. Müller, 1776) is distinctly distinguished from *P. tesselatus* which was reported in Korean fauna: body form, length ratio of arm to disc and surface of dorsal membrane. This species was characterized by stellate body form. Supradorsal membrane is thick, but contains thorny perforated rods. Peculiar adambulacral armature forming transverse comb bears five to nine webbed spines.

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References

Cherbonnier, G. 1969. Echinodermes récoltés par la *Thalassa* au large des côtes ouest de Bretagne et du Golfe de Gascogne (3-12 août 1967). Bulletin du Muséum National d'histoire Naturelle Paris 41:343-361.

Clark, A.M. and M.E. Downey. 1992. Starfishes of the Atlantic. Chapman and Hall, London, UK., pp. 1-794.

Clark, H.L. 1905. Fauna of New England. 4. List of the Echinodermata. Occasional Papers Boston Society of Natural History 7:1-16.

Clark, H.L. 1908. Some Japanese and East Indian echinoderms. Bulletin of the Museum of Comparative Zoology at Harvard College 51:279-311.

D'yakonov, A.M. 1950. Keys to the Fauna of the USSR. No. 34. Sea Stars (Asteroids) of the USSR Seas. USSR/Jerusalem: Zoological Institute of the Academy of Sciences of the USSR (translated 1968 by Israel Program for Scientific Translations, Jerusalem).

Fisher, W.K. 1911. Asteroidea of the North Pacific and Adjacent Waters. Part. 1. Phanerozonia and Spinulosa. Bull. Unit. Stat. Nat. Mus. 76:1-420.

Ludwig, H. 1886. Echinodermen des Beringsmeeres, Zool. Jahrb. Abth. f. Syst. 1:275-296.

Ludwig, H. 1900. Arktische Seesterne. Fauna Arctica 1(3): 447-502.

Mah, C.L. 2010. *Pteraster* & Kin-Starfish that fight back with mucus. The Echinoblog [Available from: http://echinoblog.blogspot.kr/2010/09/pteraster-kin-starfish-that-fight-back.html/, accessed 28 April 2016].

Mah, C.L. and H. Hansson. 2015. *Pteraster militaris* (O.F. Müller, 1776). In: C.L. Mah (ed.), World Asteroidea database [Available from: World Register of Marine Species at http://www.marinespecies.org/aphia.php?p=taxdetails&id=124147, accessed 12 April 2016].

Mortensen, T. 1927. Handbook of the echinoderms of the British Isles. Oxford University Press, London, pp. 1-471.

Müller, J. and F.H. Troschel. 1842. System der Asteriden braunschweig, pp. 1-134 (cited from Fisher WK, 1911).

Müller, O.F. 1776. Zoologiae Danicae Prodromus, pp. 1-234 (cited from Fisher WK, 1911).

Pawson, D.L., D.J. Vance, C.G. Messing, F.A. Solis-Marin and C.L. Mah. 2009. Echinodermata of the Gulf of Mexico. In: D.L. Felder and D.K. Camp (eds.), Gulf of Mexico Origins, Waters, and Biota. Biodiversity. Texas A&M Press, College. pp. 1177-1204.

Shin, S. 2010. Sea stars: Invertebrate fauna of Korea. Nat. Inst. Biol. Res., Korea 32:1-150.

Verrill, A.E. 1914. Monograph of the shallow-water starfishes of the North Pacific coast from the Arctic Ocean to California. Smithsonian Inst., Harriman Alaska Ser. 14:1-408.

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